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EXAMINER	
ROBERTS, JESSICA M	

ART UNIT	PAPER NUMBER
2609	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/822,476	ANTONIS, JAN	
	Examiner	Art Unit	
	Jessica Roberts	2609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 May 2005(Status Inquiry)*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☒ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

VU LE
SUPERVISORY PATENT EXAMINER

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/20/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The disclosure is objected to because of the following informalities:

a. The term specialized is misspelled, paragraph [0007].

b. The term lane is missing the letter "p", paragraph [0077].

c. The word bevelled should be replaced with "beveled".

Appropriate correction is required.

Claim Objections

2. Claim 3 is objected to because beveled is misspelled.

3. Claims 12-13 objected to because of the following informalities:

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 12-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Per claim 12, a single claim which claims both an apparatus and the method steps of using the apparatus is indefinite. Ex Parte Lyell, 17 USPQ2d 1548 (Bd. PA&I. 1990). The examiner takes the positions that claim 12 is a method claim.

Per claim 13, it is being rejected for being dependent on rejected claim 12.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. **Claims 1-8, 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kosuge et al, U.S. 6,571,196 in view of Bachelder et al, U.S. 5, 974,169**.

Regarding claim 1, Kosuge discloses a work surface providing an object plane on which, in use, the object to be inspected is located (XY stage; col. 4 line 14 and **6**); and a camera arranged with respect to the work surface so that at least part of the work surface is within the camera's field of vision (video camera; col. 1 line 16-19 and **3**), the camera being arranged to capture an image of the object (fig. 2), the image comprising a plurality of image data components (pixels; col. 3 line 39), the system further including

an apparatus for processing the object image (processor; col. 4 line 12 and **4**), the apparatus being arranged to receive the object image from the camera and to identify a plurality of said image data components that represent the position of a respective edge component of the object in an image plane, wherein, during the capture of an image by the camera, the camera and the object are fixed with respect to one another (Kosuge; fig. 1), upon determining that an object edge data component is offset from the work surface, to adjust the value of the object edge data component by an amount depending on the ratio of the size of the offset in a direction generally perpendicular with the work surface to the perpendicular distance of the camera's focal point from the object plane (Kosuge; XY stage moves the inspection object into a view field of the optical microscope, col. 8 line 62-64. The examiner takes the position that, upon determining that an object edge data component is offset from the work surface, to adjust the value of the object edge data component by an amount depending on the ratio of the size of the offset in a direction generally perpendicular with the work surface to the perpendicular distance of the camera's focal point from the object plane is nothing more that adjusting the field of view for the camera. Also, the examiner takes the position that the offset is when the object is not located in the field of view of the camera).

Kosuge fails to teach the processing apparatus being further arranged to determine whether each object edge data component relates to an edge of the object that lies on the work surface or to an edge of the object that is offset from the work surface; and processing apparatus being arranged to project each image edge data

component onto the object plane to produce a respective object edge data component in the object plane.

However, Bachelder teaches the processing apparatus being further arranged to determine whether each object edge data component relates to an edge of the object that lies on the work surface or to an edge of the object that is offset from the work surface (points apparently lying on a boundary of the object, but outside a bounding box, are ignored, col. 2 line 31-34); and processing apparatus being arranged to project each image edge data component onto the object plane to produce a respective object edge data component in the object plane (the boundary points in the image are labeled to denote the respective edges to which they belong based on the locations and orientations of those points, and locations of the plural bounding boxes, col. 2 line 26-29).

Therefore, it would have been obvious to one of ordinary skill in the art to modify the apparatus of Kosuge with the technique as disclosed in Bachelder in order to provide improved machine vision methods and, particularly, improved methods for determining characteristics of an object in an image.

Regarding claim 2, the combination of Kosuge and Bachelder as a whole further teach wherein when an edge profile of the object taken in a plane generally perpendicular to the object plane is generally perpendicular to the object plane, or is undercut, said object edge data component is adjusted by subtracting an amount substantially equal to said ratio multiplied by the relative distance between the object edge data component and the position of the camera's focal point in the object plane

(Koguse, the XY stage moves the inspection object into a view of field of the optical microscope, col. 8 line 62-64. Furthermore, by moving the either the camera or the stage, it would allow for the object to be positioned a field of view of the camera).

Regarding claim 3, the combination of Kosuge and Bachelder as a whole further teach wherein when an edge profile of the object taken in a plane generally perpendicular to the object plane is beveled (Bachelder, determining the characteristics of the object of any polygon shape; col. 4 line 64-66) the processing apparatus is arranged to determine if the angle of the bevelled edge profile is greater than the angle made by a line of sight from the camera's focal point to said object edge data component and, upon so determining, to adjust said object edge data component by subtracting an amount substantially equal to said ratio multiplied by the relative distance between the object edge data component and the position of the camera's focal point in the object plane and by adding an amount substantially equal to the distance in the object plane between the edges of the bevelled profile along said line of sight (Koguse, the XY stage moves the inspection object into a view of field of the optical microscope, col. 8 line 62-64. Furthermore, by moving the either the camera or the stage, it would allow for the object to be positioned a field of view of the camera).

Regarding claim 4, the combination of Kosuge and Bachelder as a whole further teach wherein when an edge profile of the object taken in a plane generally perpendicular to the object plane is undercut (Bachelder, determining the characteristics of the object of any polygon shape; col. 4 line 64-66) and when the processing apparatus determines that an object edge data component relates to an edge of the

object that lies on the work surface, the processing apparatus is arranged to determine if the angle of the undercut edge profile is greater than the angle made by a line of sight from the camera's focal point to said object edge data component and, upon so determining, to adjust said object edge data component by an amount substantially equal to the distance in the object plane between the edges of the undercut profile along said line of sight (Koguse, the XY stage moves the inspection object into a view of field of the optical microscope, col. 8 line 62-64. Furthermore, by moving the either the camera or the stage, it would allow for the object to be positioned a field of view of the camera).

Regarding claim 5, the combination of Kosuge and Bachelder as a whole further teaches the processing apparatus determines whether each object edge data component relates to an edge of the object that lies on the work surface or to an edge of the object that is spaced apart from the work surface by calculating a respective first parameter relating to a notional reference line extending from the object edge data component, calculating a second parameter relating to a notional line extending between the object data component and a reference point in the object plane, and comparing the difference between said first parameter and said second parameter against a threshold value (Bachelder; discloses where the method can use optional steps to identify and discard categorized boundary points that are out of line with similarly situated points. In addition, Bachelder also teaches any points lying more than a specified distance from the corresponding line are discarded, col. 9 line 51-63 and **48,50.** Furthermore, the examiner takes the position that the object is spaced apart

from the work surface to be that object edge is not in proximity of the other object edges).

Regarding claim 6, the combination of Kosuge and Bachelder as a whole further teaches wherein said first parameter comprises the value of an angle between an angle reference axis and said notional reference line extending from the object edge data component (Bachelder, col. 8 line 32-46 and fig. **3E** Bachelder discloses a method that categorizes boundary points of the object in the image as corresponding with edges of the real world object, or its model, if those points lie in the corresponding bounding boxes. In accord with steps **42,46** the method identifies points as residing in bounding boxes and therefore corresponds to the appropriate edge).

Regarding claim 7, the combination of Kosuge and Bachelder as a whole further teaches second parameter comprises the value of an angle between the angle reference axis and said notional reference line extending between the object edge data component and said reference point (see analysis for claim 6. Furthermore, the method as disclosed by Bachelder includes to find points in respective bounding boxes, compare orientations of point with expected orientations and thus categorizing points as correlation with model or real-world object **42,44,46**).

Regarding claim 8, the combination of Kosuge and Bachelder as a whole further teaches said reference point on the object plane comprises the position of the camera's focal point in the object plane and said notional reference line extending from the object edge data component comprises a line normal to the object at said object edge data component, and wherein said threshold value is 90 degrees (see analysis for claims 6-

7. Furthermore, the method as disclosed by Bachelder includes to estimate position, orientation and uncertainty of object in image which includes where the points have a specified tolerance of the expected angular orientation of an edge, if so, the method categorizes the points as corresponding with the associated edge, col. 10 line 19-36 **36,42,44,46**).

Regarding claim 11, which recites a corresponding apparatus to the inspection system of claim1. Thus, analysis and rejection made in claim 1 also apply here because the inspection system in claim 1 would necessitate the need for an apparatus capable of providing the limitations of the apparatus in claim 11.

Regarding claims 12-13, which recite a corresponding method to the system for inspecting of claim 1. Thus, the analysis and rejection made in claim 1 also apply here because the inspection system in claim 1 would have necessarily performed the method steps in claim 12.

In further regards to claim 13, the combination of Kosuge and Bachelder as whole further teach a processor bases system. Hence a computer program product comprising computer useable code for causing a computer to perform the method steps of the system of claim 1 would have been inherent.

8. Claims 9-10 are rejected under 35 U.S.C 103(a) as being unpatentable over Kosuge et al. US 6,571,196 in view of Bachelder et al. US 5,974,169 and further in view of Buckley et al. US 6,064,759.

Regarding claim 9, the combination of Kosuge and Bachelder fails to teach the processing apparatus is arranged to calculate a line of sight from the camera's focal

point to the object edge data component and to determine the point at which the line of sight substantially meets the object edge, and to determine the amount of the offset depending on the location of said point.

However, Buckley teaches using a camera and a laser to determine surface measurements of the objects. The camera in conjunction with the laser intersects the object; the intersection points on the object are illuminated as a line and on the plate as a line. Each frame of the camera records the image of laser lines illuminating object as a set of three values; column value, row value and frame number. The set of values can be transformed or mapped into the (x, y, z) coordinate system to give the location of xyz points on the object surface with respect to the object reference system, col. 6 line 6-67 and col. 7 line 1-67 and col. 8 line 1-14).

Therefore, it would have been obvious to one of ordinary skill in the art to modify Kosuge and Bachelder with the technique as disclosed in Buckley in order to optimize the inspection process in order to increase the speed and improve the accuracy of the inspection.

Regarding claim 10,the combination of Kosuge, Bachelder, and Buckley further teach wherein the line of sight lies in a plane substantially normal to the edge of the object at the location of the object edge data component (see claim analysis for claim 9. Furthermore, Buckley teaches 3D imaging from edge points constructed from the column value, row value, and frame number of the pixel, col. 12 line 25-31).

Conclusion

9. The referenced citations made in the rejection(s) above are intended to exemplify areas in the prior art document(s) in which the examiner believed are the most relevant to the claimed subject matter. However, it is incumbent upon the applicant to analyze the prior art document(s) in its/their entirety since other areas of the document(s) may be relied upon at a later time to substantiate examiner's rationale of record. A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. W.L. Gore & associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). However, "the prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed...." In re Fulton, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004).

Contact

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessica Roberts whose telephone number is (571) 270-1821. The examiner can normally be reached on 7:30-5:00 EST Monday-Friday, Alt Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vu Le can be reached on (571) 272-7332. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jessica Roberts/

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SUPERVISORY PATENT EXAMINER